

**CHAPTER 9 - UNCERTAINTY ANALYSIS**

The second prospective analysis of the CAAA will provide a comprehensive economic analysis of air regulations using the best available methods and data. The cost and benefit estimates generated by this analysis will be uncertain, however, because of data and model limitations, measurement error, and the various modeling assumptions and choices necessary to implement such a complex and broad analysis. The identification and appropriate characterization of these uncertainties is an integral part of the second prospective analysis because it provides appropriate context for the results of this analysis.

This chapter presents our approach to characterizing uncertainty in the results of the second prospective analysis. This revised analytical plan reflects a significant new effort on the part of EPA to quantify previously unquantified uncertainties in the analysis, particularly [in the areas of concentration-response uncertainties in the PM-premature mortality connection](#). This focus for the second prospective, along with other research investments in the process or planning stages, is a major component of the Agency's response to the National Academy of Sciences (NAS) recommendations to EPA concerning estimates of the benefits of air pollution. The Agency's plans are farthest along [in the areas of critical concentration-response](#), but our plan for this study also includes initial efforts in the areas of cost, emissions, and air quality modeling uncertainties, as well as a commitment to follow-up on these initial analyses with subsequent research targeted on those parameters most critical to the overall conclusions.

This chapter consists of three parts. The first outlines how uncertainty was addressed in the first prospective. The second provides an overview of our plans for addressing uncertainty in the second prospective, including our revised approach to characterizing cost and benefit uncertainties. The last section presents a list of the major uncertainties from the first prospective and indicates the potential effect of our analytical plan for the second prospective on those uncertainties.

**Review of Approach in First Prospective**

EPA made use of four methods for characterizing uncertainty in the first prospective: probabilistic modeling; sensitivity tests; alternative paradigms; and qualitative characterizations.

**Probabilistic Modeling**

In the First Prospective, probabilistic analysis was used to model uncertainty in the human health effects of criteria pollutants and in the economic valuation of human health effects. For example, the value of a statistical life (VSL) input was based on analysis of results of 26 mortality risk valuation studies. In order to characterize uncertainty in this important input parameter, we

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